Working Paper

"Does Spending More Than the Challenger Lead to a Greater Percentage of the Vote?"

Yameen Huq, Alice Kwak, Darion Carter

April 20, 2013

Abstract

Previous studies indicate that campaign spending is not a significant factor in determining an incumbent's share of the vote. In this study, only "competitive" races, defined by Cook Political Report as "Lean Republican," "Even" or "Lean Democratic", were considered to examine the the significance of campaign spending without endogenous effects. Other variables, such as the district's median income, district's population, number of terms in office, type of race (Senate or House), and education level were also analyzed for their effects on campaign spending and vote share. Results of the present study suggest that the higher the spending difference between the incumbent and the challenger, the greater the incumbent's vote share. The effect of campaign spending also decreases at higher levels of spending and increases with candidates that have longer political careers.

I. Introduction

Past research indicates that political incumbents have a greater chance at winning election. For example, nine out of the thirteen United States Presidents since World War II have won re-election. Since 1954, Congressional incumbents generally win re-election at rates around 90%.[1] However, not all incumbents win re-elections, implying there are other factors that influence an incumbent's percentage of the votes. This could include variables such as the district's median income, the district's education level, the level of incumbency, and the party of the candidate. The most commonly cited variable in popular wisdom, though, is campaign spending. The partial repeal of the Bipartisan Campaign Reform Act by the Supreme Court in *Citizens United vs. Federal Election Commission* has led to a large increase in campaign spending.[2] If campaign spending skews elections in favor of the bigger spender, this could be a reason to enact campaign finance reform.

The main null hypothesis with regards to campaign spending is that greater campaign spending by the incumbent over the challenger does not increase the incumbent's percentage of the vote once the other major variables are controlled. This particular paper will assess competitive Congressional elections in 2012, as determined by the Cook Political Report. Since the generally accepted purpose of elections is for the better candidate to win, a significant correlation between campaign spending and the percentage of the vote could imply that some degree of campaign finance regulation may be necessary. By examining the effect of campaign spending in the most recent election, this paper can provide support for whether or not campaign finances should be regulated. It can also assess the returns to spending in a campaign and whether or not those returns diminish at greater rates. This can be useful for campaign teams in assessing how much time should be devoted to fundraising.

II. Literature Review

One of the major analyses of the effect of campaign spending on electoral outcomes was on the Congressional elections of 1972 and 1974. The ordinary least-squares (OLS) regression model indicates that the incumbent's spending has an insignificant effect on the incumbent's electoral performance. This is explained by the idea that if the incumbent already expects a larger vote and predicts victory, then he will adjust his campaign spending accordingly. The paper also addresses the reciprocal causation problem of the candidate's campaign spending affecting the vote and the vote also affecting the spending with his two-stage least squares (2SLS) regression model. It finds that spending by the incumbent is less effective than spending by the challenger because voters are already familiar with the incumbent with the additional spending adding little to the voters' preexisting views. In contrast,

additional spending by the challenger is more likely to increase voter recognition. Therefore, the incumbent's spending is less effective than the challenger's spending.[3]

Another paper examining the effect of campaign spending on election outcome found that the Democratic candidate's spending had a positive effect on the Democratic candidate and no effect on the Republican candidate. However, the Republican candidate's spending had a negative effect on the Democratic candidate and a small, but positive effect on the Republican candidate. However, the study only consisted of data from the Congressional Election of 1972 in California with a limited data set of only 33 data points.[4]

Another similar analysis was conducted on the 2006 Congressional elections. It offers a reasonable explanation as to why even when 90 percent of the incumbents are re-elected, the incumbents still spend so much on the re-election campaigns. It does this by including the percentage of registered voters who have the same party affiliation as the candidate as an explanatory variable. The results suggest that while spending does increase the percentage of votes obtained, the effect is less pronounced for the incumbents, which is why some incumbents feel compelled to spend so much even if their re-election is almost guaranteed. He also explains that the incumbent's re-election is assured because of the "power of incumbency." According to his OLS regression result, the incumbent holds a 24-point advantage over his rival. Party affiliation, however, is not as significant as incumbency. Holding all else constant, a one-point increase in the party affiliation only increases a candidate's vote share by 0.1 percentage points.[5]

One prior paper on campaign finance attempted to find a reason why incumbents continue to outspend their challengers in a majority of elections even though the incumbents seeking re-election are very successful, winning 90% of the time. Past research often assumed that the incumbent's ability to repel the challenger is independent of his behavior while in office. To correct this deficiency, the paper provided an analysis on Congressional elections between 1978 and 1984 to capture the effects of campaign expenditures, tenure, the consistency of the incumbent's votes with his constituents' preferences, and the size of voter turnout. The results indicate that a challenger's share of the vote are affected to a greater extent by his own spending than by incumbent spending and that tenure increases the votes received by incumbents. It also found that Republicans fare better in low turnout districts, while Democrats do better in high turnout districts.[6]

A previous important variable, diminished by recent policy, is the role of contribution limits. These limits differ among states causing campaign spending levels in different states to vary significantly. The last paper reviewed tests whether campaign expenditures by candidates are more productive when

candidates are subject to contribution limits. The results from the study indicate that campaign expenditures by incumbents and challengers are more productive when candidates are running in a state with campaign contribution limits. Consequently, incumbent spending and challenger spending are equally productive in increasing their vote share. In states with contribution limits, campaign spending is effective for increasing vote shares for both the incumbent and the challenger, contrary to the most previous findings on the ineffectiveness on incumbent's campaign spending in Congressional elections.[7]

The study presented in this paper addresses the shortcomings of the previous studies in the following ways. First, it solves for the endogeneity issue or the problem that causality between campaign spending and expectations of victory run in both directions. This is done by only examining races deemed "Competitive" by the Cook Political Report. Because the expectation of victory is not clearly predicted in these races, it is less likely that this would drive the level of campaign spending in a race. Second, since elections are also the definitive zero-sum game, this study, unlike previous ones, uses a spending variable that looks at how much more the incumbent has spent over the challenger. This will show if the percent difference in spending matters as opposed to raw totals, which are more likely to be skewed by variables, such as population and income. Third, the model in this study also adds a variable for the length of an incumbent's political career to see greater name recognition played a key role in increasing an incumbent's share of the vote. It also adds in variables that could potentially interact with spending, such as median income and the general education level. Fourth, a Grubb's test was applied to the data set to drop data points with outlier levels of incumbent spending to show the effect of spending in races that better represent the population. Fifth, the model is more useful because it provides a quadratic factor on campaign spending to assess diminishing returns; something that could potentially be useful in Congressional campaigns. Finally, the model builds upon the Congressional elections of 2012, so it can see the effect of spending in a world with greater Internet penetration and social media usage as well as deregulated campaign finance laws.

III. Data

The key dependent variable to be examined is the victor's margin of victory. The data for this variable are the incumbents' share of the vote for the 2012 House and Senate elections. The model includes only the state or congressional districts that were determined to be a competitive election. An election was determined to be competitive if its cook partisan index was in the range of +3 R to +3 D. This was done instead of looking at voting percentages because a race can be uncompetitive even with close percentages if the historical variance of that race is low enough. The Cook's Partisan Index

accounts for this and therefore labels competitiveness based on more metrics than just final percentages. This is because it would cause campaign costs to be much higher in those districts and possibly skew voter's choice towards down ticket effects.

Our key independent variable is the difference between the incumbent and the challenger's personal spending. This is to show whether spending more than an opponent correlates with a larger percentage of votes. The way this difference was calculated was subtracting the challenger's spending from the incumbent's spending and dividing that by the challenger's spending. Also included was the incumbent's and challenger's respective spending totals to determine if if absolute spending plays a critical part in the outcome of the election.

% Spending Difference from Challenger" Calculation:

%

$$= \frac{(\qquad\qquad - \qquad\qquad)}{\qquad\qquad}$$

Also included in this model was population, used to determine whether the size of the district's population may have an effect on the incumbent's vote share. The natural log of population was included to convert the populations into percentages that could be better compared.

Education was also included as a variable created by looking at the percentage of the population that has a bachelor's degree or greater. The incumbent's vote share may partially be dependent on the education level of the voting population.

Median income was included in the model because a wealthier population could access information more quickly, thus reducing the effect of money on an incumbent's vote share. The natural log of median income was also used in the model to convert the absolute value of median income into a percentage that could be better compared.

The number in terms of terms that the incumbent was in office was included to see if tenure in office plays a part in determining the incumbent's share of the vote. This was done to account for the incumbency effects in the voter's decisions

The percentage of the incumbent's vote in the previous election was included as well to see if the there is a correlation between the previous election's vote share and the current election's vote percentage.

The quadratic of the percent difference in spending variable was included. This is to find out the effects of this variable at different levels of spending. More specifically, it is included to determine whether there are diminishing returns from at greater levels of campaign spending.

Two dummy variables were included in the model, the incumbent's party and the type of electoral race that was taken place. By including the variable for the party, it is possible to see whether the incumbent's party affiliation, whether Democrat or republican, played a part in their percent of the vote. The type of the election, if it was a senate race or a race in the House of Representatives, was looked at to determine whether being in either house has a significant effect on an incumbent's reelection efforts.

Eight interaction variables were included in the model. All of these are multiplied by the percent difference in spending to ascertain whether the variables had a measure of influence by the by the percent spending difference. The variables in question are median income, the incumbent's party, the type of electoral race, the incumbent's number of terms in office, the percent of the vote from the previous election, the percent of the population with a bachelor's degree or higher, and the natural log of the population, and the total population.

The incumbent's time in office was collected from the United States Congress's website.The voting percentages and cook partisan voting indexes were collected from the Brookings Institution. Campaign spending data was collected from Opensecrets.org. The demographic data, such as education, income, and population, were all found in the American FactFinder of the U.S. Census.[8,9,10]

Table I: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Incumbent Party (Democrat = 1, Republican = 0)	52	0.423077	0.498868	0	1
# of Terms in Office	52	3.211538	4.103258	0	21
Vote Share of Incumbent in Previous Election (%)	50	56.177	5.952618	47.5	70.61
Vote Share of Incumbent in 2012 Election (%)	52	52.57308	4.843516	37.9	61.8
Type of Race (Senate Race = 1, House Race = 0)	52	0.153846	0.364321	0	1
Total Spending by Incumbent (1000's of Dollars)	52	4768.88	5763.611	1024.6	24840.22

Total Spending By Challenger (1000's of Dollars)	52	3230.592	4424.826	128.95	21299.1
% Spending Difference Over Challenger	52	126.8671	181.9839	-73.9857	694.5715
Median Income of Households ($)	52	57278.92	13254.21	34285	85598
Ln(Median Income)	52	10.93013	0.227205	10.44246	11.35742
% of Popoulation with Bachelor's Degree or Greater	52	29.625	7.801078	7.7	48.8
Ln(Total Population)	52	13.77791	0.833573	13.35189	16.74343
(% Spending Difference Over Challenger)^2	52	48576.51	116294.8	0.037213	482429.6
(% Spending Difference)*(Median Income)	52	1392.13	2014.627	-822.533	7567.719
(% Spending Difference)*(Incumbent Party)	52	65.14549	162.0897	-38.5177	694.5715
(% Spending Difference)*(Type of Race)	52	9.13672	42.65581	-33.7379	272.2847
(% Spending Difference)*(# of Terms)	52	397.7338	899.0999	-739.857	4689.322
(% Spending Difference)*(Vote Share of Incumbent in Previous Election)	50	7346.134	10420.69	-4550.12	39842.42
(% Spending Difference)*(% of Population with Bachelor's Degree or Greater)	52	4066.268	6669.128	-2175.18	29678.54
(% Spending Difference)*(Ln(Total Population))	52	1717.682	2443.371	-999.753	9306.806
Total Population	52	1795480	3442589	629005	1.87E+07
(% Spending Difference)*(Total Population)	52	1.41E+08	3.61E+08	-4.27E+08	2.46E+09

The data shown above in Table I passes the first Gauss-Markov assumption, since as the later regression shows, all of the parameters are linear. All of the independent variables are random since they all come from districts whose only common factor is that they fall within the range +3R to +3D on the cook partisan index. The variables do not appear to be collinear with each other since population and median income are independent of political circumstances. The fourth assumption as to whether or not the expected value of the error deviates from 0 given a variable is likely satisfied since the earlier models estimated in the results section include a large quantity of variables that could affect vote shares. However, there factors we are unable to include, such as Internet penetration and types of advertising, which could potentially violate the fourth assumption. The fifth assumption is satisfied because all significant variables show no signs of heteroscedasticity in the graphs.

Within the descriptive statistics there are a number of observations which are drastically different from their means. For example, the quadratic term $(\%\ Spending\ Difference\ Over\ Challenger)^2$ has a minimum value of 0.037213, a maximum value of 482429.6, and mean of 48576.51. This large range in spending could mean leverage points, although all outliers were removed when sanitizing the data. The total spending by Incumbent variable has a minimum value of 1024.6 and a maximum value of 24840.22. The maximum value is drastically higher than the mean value of 4768.88. Such an outlier could possibly make a large impact on the dependent variable.

IV. Results

The simple and multiple regression models estimated can be found below in Table II:

Table II: Estimated Models

Dependent Variable 2012 Incumbent party/candidate Vote Share				
Independent Variables	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**
% Spending Difference from Challenger	0.0139685 *** (4.36)	0.0134735 *** (3.85)	-0.3007295 (-0.92)	0.0290239 *** (3.36)
# of Terms in Office		0.1989338 (1.27)		
Vote Share Last Election		0.014333 (0.13)		
Ln(Median Income)		-4.93013 (-0.93)		
Ln(Population)		0.5551449 (0.35)		
% with Bachelor's Degree (2011 ACS Five-year estimate)		0.0211142 (0.13)		
Incumbent Party (1 if Democrat, 0 if Republican)		2.273477 (1.55)		
1 if Senate Race 0 if Congressional		-1.817455 (0.654)		
Spending Difference Squared [B]			-0.0000255 (-1.44)	-0.000039 *** (-2.97)
Spending * Ln(Median Income) [A]			0.0320794 (1.09)	
Spending * Party [A]			-0.0126749 (-1.39)	
Spending * House [A]			0.0082948 (0.44)	
Spending * Terms [A]			0.0015269 (1.27)	0.0021831 ** (2.52)
Spending * Previous Election Vote [A]			0.0006568 (0.68)	
Spending * Education [A]			-0.0014452 (-1.29)	
Spending * Ln(Population) [A]			-0.0006727 (-0.06)	
No. of Observations	52	50	50	50
R-square	0.2755	0.3988	0.4683	0.4339

* Significant at 10%, **5%, ***1%
A: Interaction Term
B: Quadratic Term

The simple linear regression estimated in Model One is based on Equation 2:

$$\text{[illegible]} = \beta_0 + \beta_1(\%\ \text{[illegible]}) + \varepsilon \qquad (2)$$

Table II shows that in the simple regression model, the *% Spending Difference From Challenger* is statistically significant at the 1% significance level with a t-statistic value of 4.36 and a p-value of 0.000. It indicates that one percent increase in that variable is expected to increase the incumbent candidate vote share by 0.014%. This means that in a simple model, greater incumbent spending over the challenger correlates positively with a greater share of the vote for the incumbent.

The first multiple linear regression model (Model 2) included *# of Terms in Office, Vote Share in Last Election, Ln(Median Income), Ln(Population), % with Bachelor's Degree or Greater, Incumbent Party*, and *Dummy Senate* (House) variable. All variables, with the exception of *% Spending Difference from Challenger* variable, were found to be insignificant. *% Spending Difference* was still found to be significant at the 1% significance level.

An F-test was used to test for joint significance for the insignificant variables of Model 2. Based on the F-test result, the joint significance of the variables, excluding the *% Spending Difference from Challener* variable, was found to be insignificant.

Model 3 dropped all insignificant variables from Model 2 and added interaction and quadratic variables, including *Spending Difference Squared*, *Spending*Ln(Median Income), Spending*Party, Spending*Dummy Senate, Spending*Terms, Spending*Previous Election Vote, Spending*Education,* and *Spending*Ln(Population)*. In this case, all variables were found to be insignificant.

However, after using an F-test to test for joint significance, *% Spending Difference from Challenger*, *Spending Difference Squared*, and *Spending*Terms* were found to be jointly significant, while the remaining variables were found to be jointly insignificant.

Table III: F-Test Table

F-Test Joint Significance				
Independent Variables	Run 1 Block 1	Run 1 Block 2	Run 2 Block 1	Run 2 Block 2
% Spending Difference from Challenger	0.0135269 *** (4.18)	0.0134735 *** (3.85)	0.0290239 *** (3.26)	-0.3007295 (-0.92)
# of Terms in Office		0.01989338 (4.18)		
Vote Share Last Election		0.014333 (4.18)		
Ln(Median Income)		-4.90313 (4.18)		
Ln(Population)		0.5551449 (4.18)		
% with Bachelor's Degree (2011 ACS Five-year estimate)		0.0211142 (4.18)		
Incumbent Party (1 if Democrat, 0 if Republican)		2.273477 (4.18)		
1 if Senate Race 0 if Congressional		-1.817455 (4.18)		
Spending Difference Squared [B]			-0.000039 *** (-2.97)	-0.3007295 (1.44)
Spending * Ln(Median Income) [A]				0.0320794 (1.09)
Spending *Party [A]				-0.0126749 (-1.39)
Spending * House [A]				0.0082948 (0.44)
Spending * Terms [A]			0.0021831 ** (2.52)	0.0015269 (1.27)
Spending * Previous Election Vote [A]				0.0006568 (0.68)
Spending *Education [A]				-0.0014452 (-1.29)
Spending *Ln(Population) [A]				-0.0006727 (-0.06)
F-test	17.43	1.29	11.75	0.43
Pr > F	0.0001	0.2979	0.0000	0.8529
R-squared	0.2664	0.3988	0.4339	0.4683

Model 4 contains all significant variables in this study and is structured as a multilinear regression like Equation 3:

$$\%\,\text{2012 Incumbent Vote Share} = \beta_0 + \beta_1(\%\,\text{Spending}) + \beta_2(\%\,\text{Spending})^2 + \beta_3(\text{Spending} * \text{Term}) + \varepsilon \quad (3)$$

In this model, *% Spending* and *% Spending Squared* were found to be significant at the 1% significance level. The interaction term for *Spending*Term* was found to significant at the 5% significance level. Since the coefficient for *% Spending* is positive, the correlation between that and the *2012 Incumbent Vote %* is positive. A 1% increase in *% Spending* leads to .029% increase in vote share. However, because % Spending Squared is negative, this means that the slope of the correlation between *% Spending* and *2012 Incumbent Vote %* decreases as *% Spending* becomes bigger. The variable

*Spending*Term* is positive, so a greater term length increases the slope of the correlation between *% Spending* and *2012 Incumbent Vote %*. For example, a ten-term Congressman receives a .02% increase in vote share for every 1% increase in spending over the challenger. A one-term Congressman would only receive a .002% vote share increase. The R-squared value of 0.4339 indicates that the data is relatively well-explained by the model and more so than it was in the simple regression model.

Model 4 is therefore the model that best predicts an incumbent's share of the vote based on the given variables. Table III below lists the sensitivities of Model 4's variables. Figure 1 below shows that *% Spending Difference* does follow a quadratic trend, with a positive slope that gradually decreases until it becomes zero. This represents the diminishing returns of campaign spending. Finding the maximum point where the slope becomes zero shows that campaign spending is expected to cease providing returns to the incumbent when the incumbent spends 372% more than the challenger. Many of the races in this study exceed that amount, which shows there are actual situations where campaign spending is expected to hit its peak on providing returns to the share of the vote.

Figure 1: % Spending Difference From Challenger vs. 2012 Incumbent Vote Share

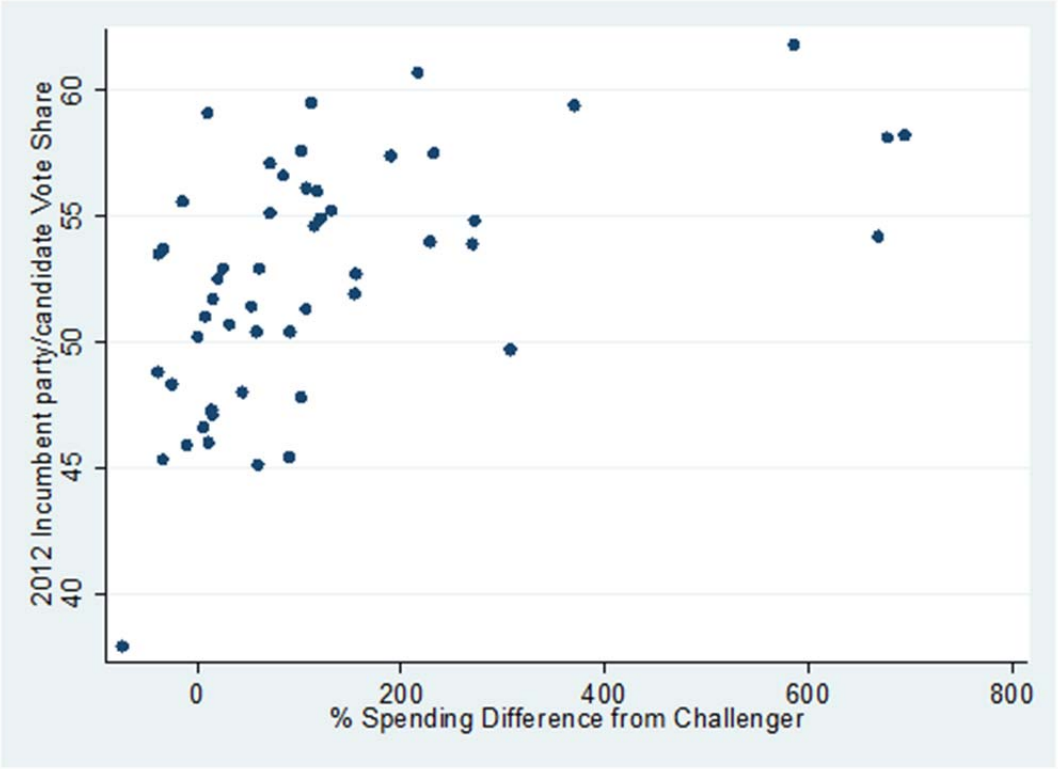
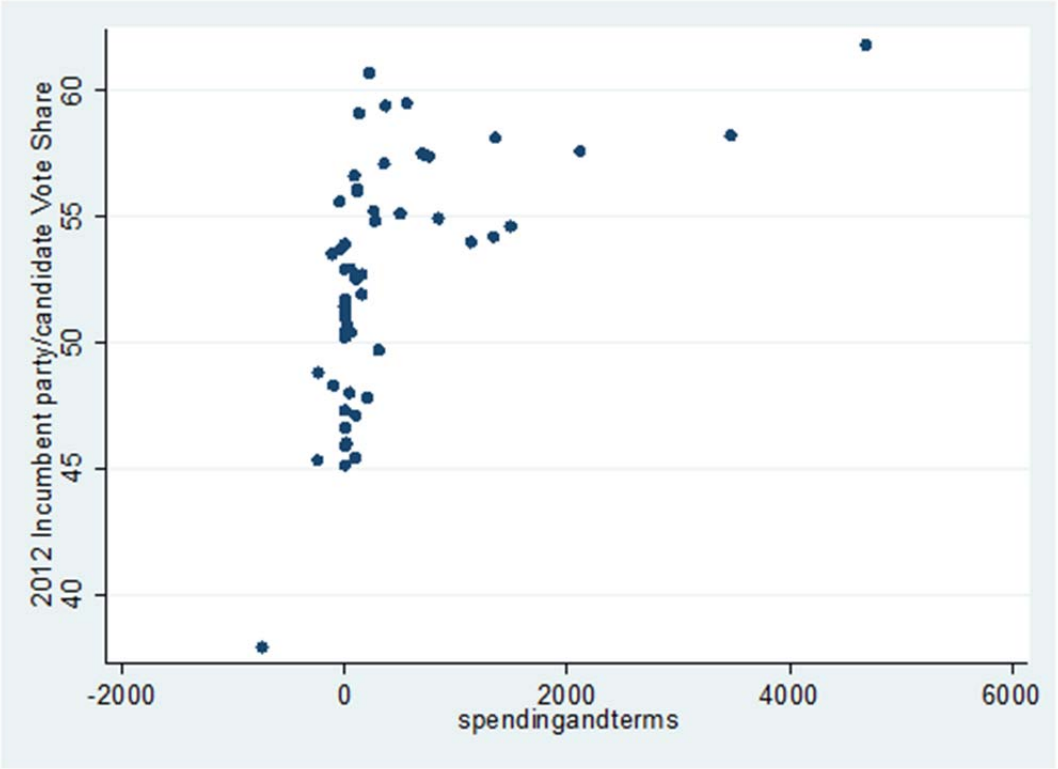


Figure 2 shows that the correlation between *Spending*Term* and *2012 Incumbent Vote %*. This means that incumbent's that have held their seat for more terms experience a greater benefit from campaign spending on their share of the vote than incumbents who have been around for a shorter

period of time. A likely reason for this is that campaigners who have practiced through more elections are likely to know how to allocate the money more efficiently.

Figure 2:(% Spending Difference From Challenger* Number of Terms) vs. 2012 Incumbent Vote Share



V. Conclusions

Based on the models from our data set, it would appear that in the 2012 election, the variables normally considered crucial to victory, such as incumbency and political affiliation, have no significant impact on incumbent's share of the vote. Even redistricting effects, proxied by the Senate dummy variable, were not found to have a significant effect on the incumbent's vote share. The only variable found to be crucial on its own is how much the incumbent spends over the challenger. The value of campaign spending was also subject to diminishing returns at a rate that causes it reach a maximum at a percentage near the sample mean. The only variable that interacted with campaign spending in a significant way was the length of the incumbent's political career. This makes sense because seasoned politicians can spend money more effectively. However, the idea that money is the only variable in our model that matters significantly, is in direct conflict with the papers mentioned in the literature survey, but is reconcilable and adds to the overall body of work for the following reasons.

First, the studies in the literature review were generally taken from elections that were held several decades ago, while this study used results from 2012. This could explain much of the difference.

For example, long political careers are often a signal for name recognition, but in a world with greater Internet penetration, this may not mean as much. Second, our study also added in several other variables to control for omitted variable bias. While these variables did not significantly affect our model, they were important in showing that campaign spending is significant even when these other variables are controlled. Third, our study avoided endogeneity issues by focusing only on competitive districts. Fourth, our study dropped outliers. Keeping the outliers would have included candidates who won by normal percentages, but spent thousands of times the money the challenger spent.

One of the flaws in this study is that it did not deal with independent expenditures made by groups such as Super PACs. This is difficult to include because independent groups are not legally allowed to directly support a candidate and must focus solely on issues generally not of a local nature. However, if independent expenditures can be linked to supporting candidates, then they should be included in the analysis. Another issue that should be examined is the role of spoilers or third-party candidates. Also, if there is data on the level of internet penetration per district or the types of services purchased through campaign spending, then that should also be included in the model. This will help fine-tune what types of services really help an incumbent increase his vote share. In the future, our model should be backfitted to previous elections to evaluate its prediction power under different circumstances. By finding more nuanced data for campaign spending, this model could be more effectively used by both campaign teams and election policymakers to achieve their desired ends.

Works Cited

1. OpenSecrets.org, (n.d.). *Reelection rates over the years*. Retrieved from website: http://www.opensecrets.org/bigpicture/reelect.php

2. Beckett, A. (2013, March 12). *Report: Campaign spending tripled after citizens united*. Retrieved from http://www.wrn.com/2013/03/report-campaign-spending-tripled-after-citizens-united/

3. Thomas, S. J. (1989). Do Incumbent Campaign Expenditures Matter?.*Journal Of Politics*, *51*(4), 965.

4. Shepard, L. (1977). Does campaign spending really matter?. *Public Opinion Quarterly : Journal Of The American Association For Public Opinion Research*, *41*(2), 196-205.

5. Gius, M. (2009). The Effects of Campaign Expenditures on Congressional Elections. *American Review Of Political Economy*, *7*(1-2), 51-66.

6. Banaian, K., & Luksetich, W. A. (1991). Campaign Spending in Congressional Elections. *Economic Inquiry*, *29*(1), 92-100.

7. Hamm, K. E., & Hogan, R. E. (2008). Campaign Finance Laws and Candidacy Decisions in State Legislative Elections. *Political Research Quarterly*, *61*(3), 458-467.

8. The Brookings Institute. *Election 2012 Data: The Impact on the House.* Retrieved from website: http://www.brookings.edu/research/interactives/house-partisanship-2012

9. American FactFinder - Census Bureau. Retrieved from website: http://factfinder2.census.gov

10. OpenSecrets.org. *Congressional Races.* Retrieved from website: http://www.opensecrets.org/races/index.php